

CARDIOVASCULAR SYSTEM

system made up of **vessels** that **transport O₂, CO₂, nutrients and waste products** through the body

CLOSED SYSTEM:

- blood never touches liquid between cells
- exchange through capillaries

VESSELS

ARTERIES

- vessels that bring blood **from the heart to the organs** (usually oxygenated blood with nutrients)

VEINS

- vessels that bring blood **from the organs to the heart** (usually not oxygenated)

CAPILLARIES

- **small** blood vessels **around the organs**
- **delivery of oxygen and nutrients** to the organs
- **absorb and carry out waste products**

BLOOD VESSEL ARCHITECTURE

ARTERIES	=	VEINS
TUNICA ADVENTITIA=	external layer	fibrous connective tissue
TUNICA MEDIA=	middle layer	smooth muscle
TUNICA INTIMA=	internal layer	endothelium
between layers of tunica=		elastic tissue: elastine

≠

bigger smooth muscle	VALVE
	stops the blood from going down

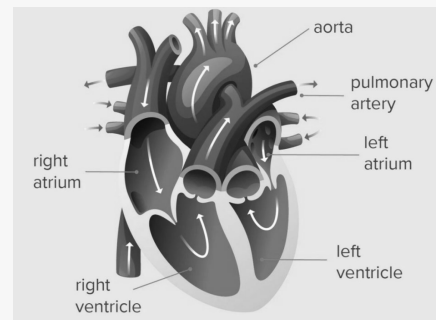
CAPILLARIES

endothelial cell	thin for exchange of substances
smooth muscle cell	small layer
PERICYTE:	feeds endothelial cells --> like connective tissue cells

CIRCULATION SYSTEMS

SMALL CIRCULATION=	connects the heart and the lungs	pulmonary circulation
BIG CIRCULATION=	connects the heart and the organs	systemic circulation

HEARTH



BLOOD CIRCULATION

RIGHT ATRIUM gets **not oxygenated** blood from the **SUPERIOR and INFERIOR VENA CAVA**

blood passes **through TRICUSPID VALVE** into the **RIGHT VENTRICLE**, most of the blood passes while the *hearth is relaxed (passive filling)*, then *small contraction for the last drop*

CONTRACTION pushes the blood into the **PULMONARY ARTERIES** through the **PULMONARY VALVE**

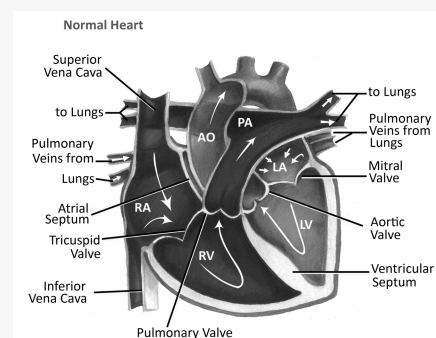
lungs where the blood exchange carbon dioxide for oxygen

LEFT ATRIUM gets **oxygenated** blood from the **PULMONARY VEINS**

blood passes **through BICUSPID or MITRAL VALVE** into the **LEFT VENTRICLE**, most of the blood passes while the *hearth is relaxed (passive filling)*, then *small contraction for the last drop*

CONTRACTION pushes the blood into the **AORTA** through the **AORTIC VALVE**

BLOOD CIRCULATION





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WALLS OF THE HEART

three+ one layer

EPICARDIUM= thin external membrane **connective tissue**

MYOCARDIUM= pumping action, most present **cardiac muscle tissue**

↳ gets nutriment and oxigen from: **CORONARY ARTERIES**

ENDOCARDIUM= thin internal layer **endothelium**

PERICARDIUM= **protective, fluid-fille sac** that **surrounds** the heart ↳ provides **lubrif-ication**

↳ protect the heart from **infections** ↳ hold the heart in **place** ↳ keep the heart **from expanding**

CARDIAC CYCLE

DIASTOLE= myocardio relaxed, atrium-ventricular valves open, blood circulates in atrio and ventricle, semilunar valves closed

ATRIAL SISTOLE = contraction of the atries

VENTRICULAR SISTOLE = ventricles starts to contract, pressure grows, atrio-ventricular valves closes, semilunar valves open

CARDIAC CYCLE AND ELECTROCARDIOGRAM

PACEMAKER= **SINOATRIAL NODE**= generates a signal that spreads through the heart

SISTOLE= relaxation

DIASTOLE= **CONTRACTION**

ATRIAL SISTOLE

P wave= depolarization of the atrias with the spread of first signal
atrial contraction→ increase the pressure→ pushes the blood into the ventricle

CARDIAC CYCLE AND ELECTROCARDIOGRAM (cont)

ISOVOLUMETRIC VENTRICULAR CONTRACTION

QRS complex= depolarization of the ventricles with the spread of signal

ventricular contraction

ventricle contracts but the blood in the ventricle stays the same

first sound: atrioventricular valves shutting valve are closed until the increase in the pressure is bigger than the pressure in the aorta

EJECTION FASE rapid ejection: high pressure and first blood

slow ejection: slower pressure and resistance from the vessels

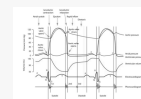
T wave= polarization of the ventricle for a new signal

ISOLVOLUMETRICAL VENTRICLE RELAXATION ventricle relax

pressure goes down

valve closes and second sound

CARDIAC CYCLE



MOST IMPORTANT FUNCTIONS

respiratory sistem= get rid of CO2 and capture O2

digestive system= bring nutrition to all the organs

kidneys and urinary system= filtration of waste (nitrogenous substances)

temperature control= vasodilatation to cool down

CAUSES OF HEART AND CARDIOVASCULAR DISEASES

excessive smoking and	consumption of alcohol
diabetes	cholesterol too high
overweight	hypertension
genes	stress
atherosclerosis=	build up in vessels of platelets: they think fat is like an injury that has to be closed
blood clot=	vessels closed by a group of red cells
trauma or injury	

DISEASES

heart disease	vascular disorders
congenital heart defects	
strokes	

STROKES (ictus)

TIA=	symptoms only last for a short amount of time, temporary blocage
ischaemic stroke=	blockage cutting off the blood supply to the brain
haemorrhagic stroke=	bleeding in or around the brain

HEART DISEASE

cardiac failure=	heart fails to circulate blood properly
heart attack=	one of the coronary arteries becomes blocked
cardiac arrest=	heart doesn't work
cardiac arrhythmia=	problem with the rate or rhythm of heartbeat

VASCULAR DISORDERS

aneurysm=	weak or expanded part of an artery
atherosclerosis=	buildup of fats, cholesterol and other substances in and on the artery walls
thrombosis=	blood clots block veins or arteries

